Network-attached DAC/headphone amplifier
Made by: Data Conversion Systems Ltd, Cambs
Supplied by: dCS Ltd
Telephone: 01954 233950
Web: www.dcsltd.co.uk
Price: £11,999

AUDIO FILE

hi-fi news OUTSTANDING PRODUCT

dCS Bartók

With the option of a high-quality headphone stage, the new entry-level dCS network DAC marks a walk on the wild side for the Huntingdon company. Can it succeed?
Review: **David Price** Lab: **Paul Miller**

By way of celebrating its 30th anniversary, dCS launched the limited edition Vivaldi One streaming DAC/SACD player [*HFN* Feb '18]. It was a present to itself, and some of the company's most well-heeled customers. Now, however, dCS's gaze has turned from past to future as it debuts its new £11,999 Bartók streaming DAC/headphone amplifier. The non-headphone version represents a saving of £2000.

Offering a headphone output in a source product is a clear step off the beaten track for this Huntingdon company. Indeed, this is the first dCS product to include an amplifier of any kind…

SMALL WONDER

Even though the Bartók is dCS's latest entry-level network DAC, and even omitting the headphone stage, it remains hugely sophisticated compared to its Debussy predecessor [*HFN* Dec '10]. It is app-controlled and also operable via a high-quality display, as are its pricier Rossini and Vivaldi big brothers. What's more, the new rotary volume control is far more useful than its forebear's fiddly 'up' and 'down' level buttons. In effect, it has become a fully functional DAC front-end – a Rossini that has shrunk in the wash, so to speak.

The company's Managing Director, David Steven, says the Bartók took two years to develop, despite the fact that much of DCS's existing technology was repurposed. It sports the latest Rossini-generation network card, power supply (one less regulated supply here), and processing board with the Ring DAC derived from the Vivaldi One [see PM's boxout, p47]. 'We threw everything we had at it, plus the option of a best-in-class headphone stage too', Steven says.

Because the digital conversion 'engine' is pretty much the same as that used in its more expensive models, the design team focused their efforts on developing the headphone module. 'That's why we first made a standalone headphone amplifier so we could voice it,' says Steven, 'and then worked with a number of leading headphone manufacturers and engineers who we know use headphones daily.'

'We learned a lot from them,' he continues, 'so we could do it right. We didn't want this to be seen as an afterthought. Indeed, we're thinking it could be the start of a new journey for us.'

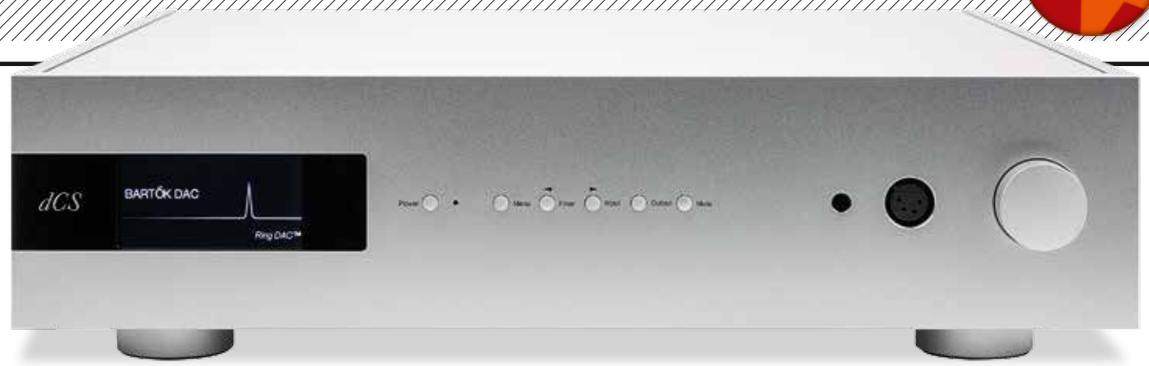
More than just a hi-fi source component, the Bartók is a way of delivering music that would have been unrecognisable to those music lovers who bought the Debussy predecessor just a decade ago. Used via the dCS app it offers instant access to streaming services such as Tidal and Spotify, and plays back a wide range of file formats, including MQA.

It also streams over Ethernet from a NAS drive, and offers an array of industry-standard digital inputs including asynchronous USB, AES/EBU and S/PDIF. The network streaming section currently runs at up to 384kHz/24-bit and DSD128, supporting all major lossless codecs, and DSD in both native and DoP guises.

USER EXPERIENCE

Visually, the Bartók is more straightforward than the dramatic Rossini and Vivaldi with their sculpted fascias. These expensive castings are replaced here by slabs of aluminium, so while the flat fascia is certainly no less substantial, you won't feel so much like a film star or captain of industry with it sitting in your equipment rack. In other ways, it's very much the same as its bigger brothers with that crisp OLED display and rotary volume control helping to define the dCS 'user experience'.

RIGHT: A Rossini PSU [brown PCB, lower left] is fed from a screened transformer [blue box] with the Vivaldi-inspired Ring DAC adjacent [red PCB]. The extra transformer [top left] feeds the optional headphone amp [lower right, on fascia]



A wide range of configuration options is accessible by pressing the menu button. Here it's possible to change the maximum analogue output level (0.2V to 6V), absolute phase, select the filter profiles for PCM and DSD, and switch on crossfeed when in headphone mode. This menu also governs any firmware updates, which is a classic dCS feature. We shouldn't forget that, despite being a decade-old, the Debussy was still receiving new functionality fairly recently – making it far less likely to become obsolete.

> 'Headphones will never play second fiddle to loudspeakers'

The easiest way to set up this unit is via the bespoke dCS Bartók app for iOS devices, which is downloadable for free from Apple's App Store. When launched, the app senses if the DAC is present on your home network and, if so, configures everything automatically. You then get full control of the unit, and the ability to change its numerous settings with a swipe of your finger on your iDevice screen.

Without the app the Bartók is not especially easy to configure because its display icons need some thinking about if you're a newcomer to the brand. Still, these soon become familiar, and there are other aspects to the way the unit works that are hugely satisfying. For example, the fine-pitch display is clear and informative – with sample rate, digital word length, PCM/DSD, *etc*, it tells you everything you need to know. Meanwhile, the metal control buttons feel reassuringly robust, and the volume control is silky in action.

There's also a separate fascia button to switch the headphone section on or off, with sockets for both balanced and unbalanced 'phones to the left of the volume control. The optional headphone preamp is mounted onto the rear of the Bartók's fascia [see inside shot, p46].

BEFORE AND AFTER

Given that the Bartók shares much of its hardware with its illustrious bigger brothers, its performance is very close. It has the same clean, ultra-detailed and expansive sound for which the brand is famous and, like both the Rossini and Vivaldi, offers excellent rhythmic flow and dynamic shading. By way of context, I had its Debussy predecessor alongside during the listening, and it's remarkable how far things have come in the past decade, the latter sounding slightly vague, flat and leaden by comparison.

Seasoned dCS followers might expect the Bartók's standout characteristic to be clarity and insight, but I'd highlight its fluidity when it comes to rhythms. Caravan's 'Nine Feet Underground' [*In The Land Of Grey And Pink*; Deram 8829832] is by no means an audiophile recording, yet the track is packed with brilliantly tight playing from this English prog rock band.

Even via its legacy S/PDIF input, the Bartók delivered the sensation of real musicians playing in perfect time with one another. This feeling of suppleness – the sense they were all relaxing into the groove – was uncanny. While perfectly syncopated, the drummer and bassist could be heard playing off one another, rather than holding to a click track. Such a fluid feel is the mark of a top-flight digital converter.

Then there's the Bartók's sheer resolution – shining a clean white light on all the individual strands of a mix without glare, coldness or excessive brightness. Believing a DAC's mettle is really tested by lo-fi tracks, rather than audiophile favourites, I played Manix's 'Oblivion' [Reinforced Records RIVET 1212 CD] – a crudely recorded early '90s techno track worked up using an old Akai sampler. In the event, it proved a pleasure to listen to (via USB) as this dCS converter dug deep into the minutiae of the mix.

I was struck by the contrast between the grimy-sounding female vocal sample used on the track and the thick, rich, sumptuous house-style lead keyboard riff, as well as the sparkling harmonics ⇢

ABOVE: Thick alloy plates form the chassis but are a substantial cost saving over the castings used in the Vivaldi. Rotary and array of buttons will navigate the various settings but the dCS iOS app will be more convenient for most users

BESPOKE BITS

With the 'rest of the world' building their digital platforms around one of a few very high quality DAC solutions from the likes of ESS Technology, Burr-Brown (Texas Instruments), Asahi Kasei and Crystal (Cirrus Logic), brands looking for more control, and individualism, in their digital engineering must turn to custom DAC algorithms running on powerful, multi-core processors such as those from the Analog Devices' SHARC family. Chord Electronics' WTA filter/Pulse Array DAC [*HFN* Apr '16] is a well-known example of this bespoke approach, but dCS's own Ring DAC technology dates back still further to 1991.

In practice the Bartók's Ring DAC aims to combine the monotonic conversion of a genuine 'single-bit' DAC with the operation of a PWM bitstream-style converter. Instead of truncating incoming data to a stream of single bits, dCS reduces LPCM (and converts DSD) to an average of 4.6 bits whose 24 possible values are mapped to the 48 'identical' current sources that comprise the Ring DAC [the matrix on the red PCB, p46]. In a traditional PWM DAC the 'bitstream' is used to control the length of time a *single* current source is held open or closed. However, dCS uses 48 current sources and these can never be truly identical in size, so the mapping of bits to current sources is randomised. Fixed errors, that would otherwise appear as harmonic distortions, are also randomised and manifest as a benign increase in noise [see Lab Report, p49]. PM

ABOVE: Digital inputs span S/PDIF (two coax, one opt), two AES/EBU (on XLRs), one USB-A for external HDDs, one USB-B for computer connection and a network loop (on RJ45s) – joined by clock I/Os (on BNCs) and variable analogue outs (RCA and XLR)

emanating from the synthesised flute voice. This patchwork quilt of samples of widely differing quality was revealed in no uncertain terms, yet it was all strung together in a pleasingly coherent way.

This superb resolution is complemented by almost cathedral-like soundstaging. It's one of those source components that makes your loudspeakers wake up and pay attention, as stereo images are forced far left and right.

This has always been a dCS forte, but streaming Kate Bush's 'Snowflake' [*50 Words For Snow*; Fish People TOCP-71202] over the wired network, felt as if I was in the studio with her! It was almost as if I was intruding into someone's personal space. Meanwhile, the deliciously rich and resonant piano playing stretched out wide to my left and right, its harmonics ringing all around me – and slap-bang in-between was Kate's icy vocal sounding as pure as I've heard it.

CAN OPENER

The partnering headphone preamp was no less impressive, my Oppo PM-1 headphones [*HFN* Jul '14] relishing some classic late '70s rock from Dire Straits in the shape of 'Sultans Of Swing' [*Dire Straits*; Vertigo 800 051-2], ably driven by the Bartók. Although not quite serving up the sort of rich, rum-soaked sound that some valve headphone stages deliver, the presentation was still surprisingly smooth and, perhaps, ever-so-slightly on the sweet side.

The track's low-end enjoyed excellent control, with a bouncy and propulsive bass guitar sound that pushed the song along with heady abandon. Indeed, the normally quite matter-of-fact PM-1s actually appeared to be enjoying themselves, turning in a vibrant and tactile sound. The midband sound mimicked the line outputs, with a bright light pushing through the mix, illuminating everything without dazzling you back. The signature Rickenbacker guitar was instantly recognisable, and Mark Knopfler's vocals had their correct 'sawdusty' texture, adding so much to the feel of the track.

The Bartók's preamp also has serious reserves of grunt to convey musical crescendos. With a tenacious grip and no hint of breathlessness as the levels increased, Kraftwerk's 'Tour De France Étape 3' [*Tour De France Soundtracks*; EMI 72435 91710 2 9] developed with shocking force as its closing dynamic peak was reached.

This new DAC is especially adept at tracking subtle dynamic changes – heard here in the way the backing keyboard patterns gently counterpointed the drum machine without falling away as larger waves of sound washed over them. Via the new Bartók at least, your headphones will never play second fiddle to your loudspeakers.

HI-FI NEWS VERDICT

Given its price relative to its more expensive dCS brothers, the new Bartók delivers superb sound quality for the money. The latest generation of dCS's Ring DAC continues to deliver an enormously detailed yet immersive sound that's high on both emotion and entertainment. Factor in this new DAC's great functionality, versatility, build quality and finish – and it's hard not to be mightily impressed.

Sound Quality: 89%

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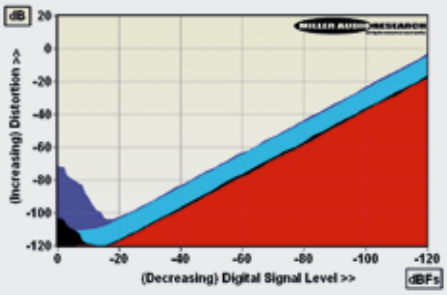
LAB REPORT

DCS BARTÓK

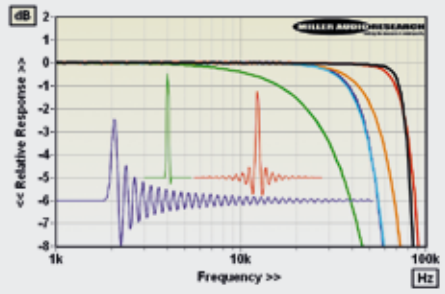
While the Bartók's Ring DAC/analogue output is based on the Vivaldi One [*HFN* Feb '18], the latter still has the slightest edge in terms of distortion (0.00009% vs. 0.00015% at –10dBFs) and A-wtd S/N ratio (117dB vs. 116dB). However, the former bests the flagship in terms of jitter: both units show a minuscule correlated jitter of <10psec at all sample rates but the Bartók has eliminated the very slight uncorrelated phase noise we saw with the Vivaldi One. In market context, both units represent the state-of-the-art in technical performance.

The Vivaldi's six custom digital filters are also shared by the Bartók, all offering a flat 20Hz-20kHz response (±0.05dB) with CD inputs. Filter 5 is the only minimum phase type, and similar to Filter 6 for 192kHz data [purple impulse and response, Graph 2]. The 'NOS' Gaussian Filter 5 is reserved for >96kHz sample rates [green traces] while Filters 1-4 are linear phase for all rates [black, red, cyan and orange]. DSD Filters 1 and 2 reach out to –8.5dB and –21dB/100kHz, respectively, while Filter 3 rolls off to –3dB/60kHz and –23dB/80kHz. The DSD Filter 4 is –0.7dB/20kHz and –6dB/30kHz before dropping steeply at 40kHz.

The partnering Class A headphone amp matches the XLR output's 600mohm source impedance with sufficient current to support 1.7W/25ohm. Unlike most DAC/headphone amps, the Bartók does not clip at 0dB volume with a peak level digital input, suggesting its *potential* maximum power output is higher than 1.7W/25ohm. Distortion increases very slightly under load over the top 10-15dB of its dynamic range, from 0.00005% to 0.0016% at 1kHz/0dBFs [red vs. black traces, Graph 1] and from 0.00025% to 0.032% at 20kHz/0dBFs [cyan vs. purple traces]. **PM**



ABOVE: THD vs. digital signal level at 1kHz (red, line out; black, headphone out into 25ohm) and 20kHz (cyan, line out; purple, headphone out into 25ohm)



ABOVE: Time/frequency responses with 192Hz data (filters 1-6 = black, red, cyan, orange, green, purple)

HI-FI NEWS SPECIFICATIONS

Maximum output (re. 0dBFs into 47kohm)	5.9V (balanced line out)
Max. power output (re. 0dBFs into 25ohm)	1715mW (headphone out)
Output Imp. (20Hz-20kHz, line/headph.)	0.50-0.71ohm/0.61-0.82ohm
A-wtd S/N ratio (0dBFs; re. 6V/10mW)	116.0dB / 115.0dB
Distortion (20Hz-20kHz, re. 0dBFs)	0.00005–0.00025%
Freq. resp. (20Hz-20kHz/45kHz/90kHz)	+0.0 to –0.0dB/–0.7dB/–7.3dB
Digital jitter (48kHz/96kHz)	<10psec / <10psec
Power consumption	33W (21W standby)
Dimensions (WHD) / **Weight**	444x115x430mm / 16.7kg